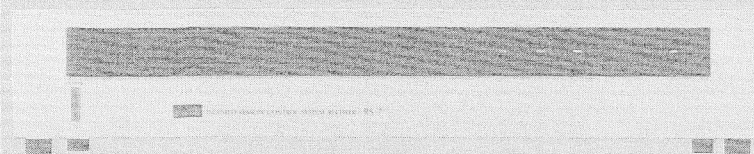


SERVICE MANUAL

INFRARED REMOTE CONTROL SYSTEM RECEIVER

SANSUI RS-7



• SPECIFICATIONS

Receiver

Input sensitivity and impedance

..... 150 mV/12 kilohms

Output level and impedance

..... 450 mV/600 ohms

Distortion at 1 kHz ... 0.07 %

Signal to noise ratio ... 70 dB

Frequency response ... 20 to 50,000 Hz
+0 dB, -1.0 dB

Power consumption ... 32 W

Power requirements ... 120/220 ~ 240 V
60/50 Hz

For U.S.A. and Canada

..... 120 V (60 Hz)

Dimensions 430 mm (16-15/16") W

87 mm (3-7/16") H

218 mm (8-5/8") D

Weight 2.9 kg (6.4 lbs) net

3.5 kg (7.7 lbs) packed

Transmitter

Coverage range 9 m (within $\pm 30^\circ$)

Dimensions 66 mm (2-5/8") W

23 mm (15/16") H

168 mm (6-5/8") D

Weight 0.2 kg (0.4 lbs) net

* Design and specifications subject to changes
without notice for improvements.



SANSUI ELECTRIC CO., LTD.



2. DESCRIPTION OF OPERATION

The equipment, RS-7, is an infrared remote control system composed of the combination of the receiving LSI, TC9134P, and the transmission LSI, TC9132P, making it possible to control the commands of 32 functions.

Since a code sensing circuit is provided for code checking with the transmitter, interference from other equipments can be prevented.

2-1. Operation of transmitter, RS-7

The transmitter, RS-7, transmits the remote control command signals of 32 functions to the remote control receiver, RS-7 by means of the CMOS LSI (TC9132P) for remote control transmission.

The command signals of 32 functions are generated when the timing signals, T1 to T4, of No. 1 to No. 4 pin output of the LSI, TC9132P are supplied as the input to No. 5 to No. 10, No. 12 and No. 13 pins of the LSI (K1 to K8) in matrix combination. (See Table 5-1 on Page 5.) During transmission of these command signals, the carrier wave is subjected to pulse modulation for the output.

The transmission signal output is applied to the luminous diode (EL-1L2) and is transferred to the remote control receiver by infrared rays.

2-2. Operation of remote control receiver, RS-7

The remote control receiver comprises a receiving signal input circuit, control circuit by LSI (TC9134P), input switching circuit, and a LED display circuit and level control circuit.

The transmission signal from the transmitter is received by the receiving element and the photo-diode (JD103), and amplified by the OP amplifier (JIC100), then only the command signals are taken out as the carrier wave is eliminated by the demodulator.

After the wave form shaping by the inverter (JIC101), the command signal input is supplied to No. 16 pin (RXIN) of the control LSI, TC9134P. As the result, the specified terminals of the control LSI (SP1 ~ 22, HP1 ~ 6, EX1 and 2, D/A out, and CP1 and 2) produce single signal, continuous signal, D/A control (Up/Down) signal and cyclic signal corresponding to respective command signals.

Cyclic signal: The output is reversed when this signal is received.

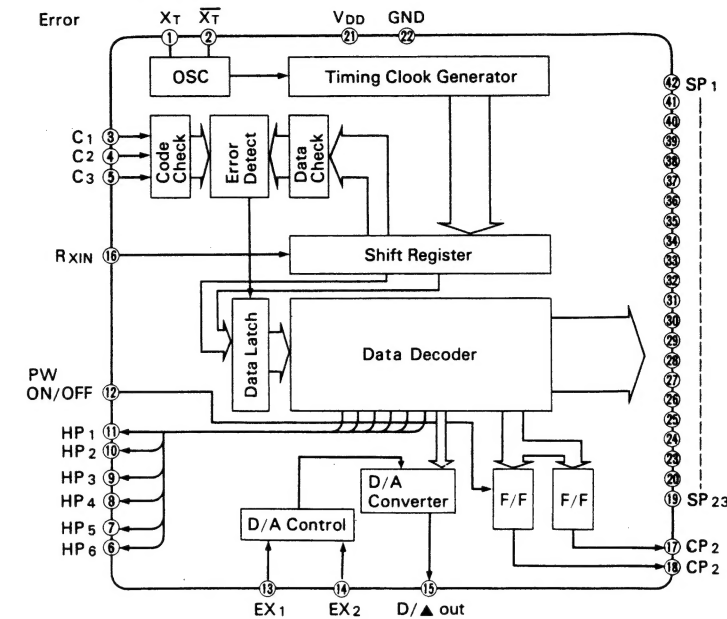
Continuous signal: While this signal is given from the transmitter, (L) level is maintained.

Single signal: When this command signal is applied, the impulse of (L) level is given as the output.

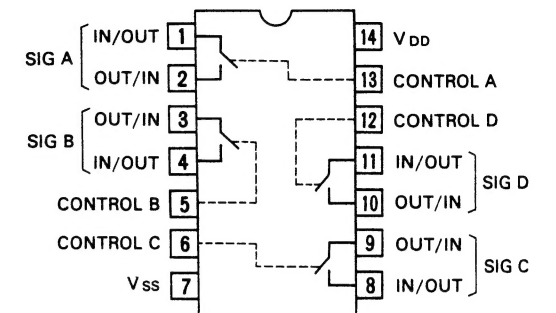
● Initializing at power making

For the initial setting of internal condition of LSI and for presetting of D/A converter, No. 12, 13 and 14 pins of LSI are kept at (L) level at the time of power making. In actual circuits, capacitors are attached to No. 12, 13 and 14 pins.

3-2. TC9134P

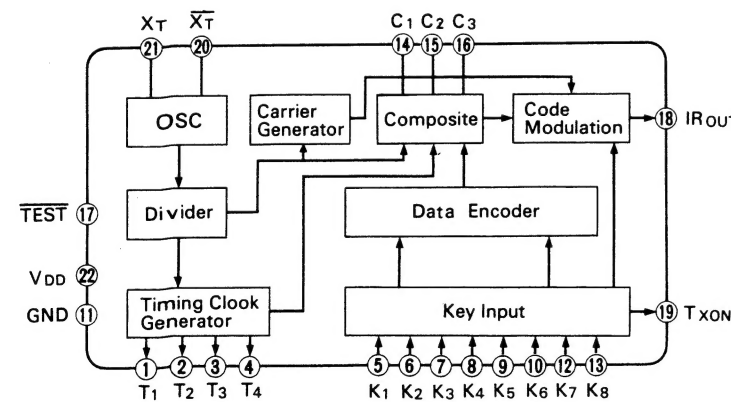


3-3. MSM4066RS



3. INTERIOR BLOCK DIAGRAM OF IC

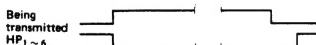
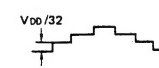
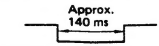
3-1. TC9132P



● Description of terminals

Pin No.	Symbol	Terminal name	Function and operation
1~4	T ₁ ~ T ₄	Timing signal output	Timing digit output terminal for key matrix
5~10, 12, 13	K ₁ ~ K ₈	Key input	Key input terminal for key matrix; capable of issuing 32 instructions with T ₁ ~ T ₄ x K ₁ ~ K ₈ .
14~16	C ₁ ~ C ₃	Code bit input	Code bit input terminal for code matching between transmission side and receiving side; good for up to 7 kinds.
17	TEST	Test terminal	Usually set at "H" level.
18	IR OUT	Transmission output	Transmission signal output; modulation with carrier wave of 38 kHz based on the assumption of 16 bits per cycle.
19	TX ON	On-transmission indicator output	Usually of "H" level, but it is of "L" level during transmission.
20, 21	X _T , X _T -	Terminal for oscillator	Terminal for oscillator; used for 455 kHz ceramic oscillators or the like.

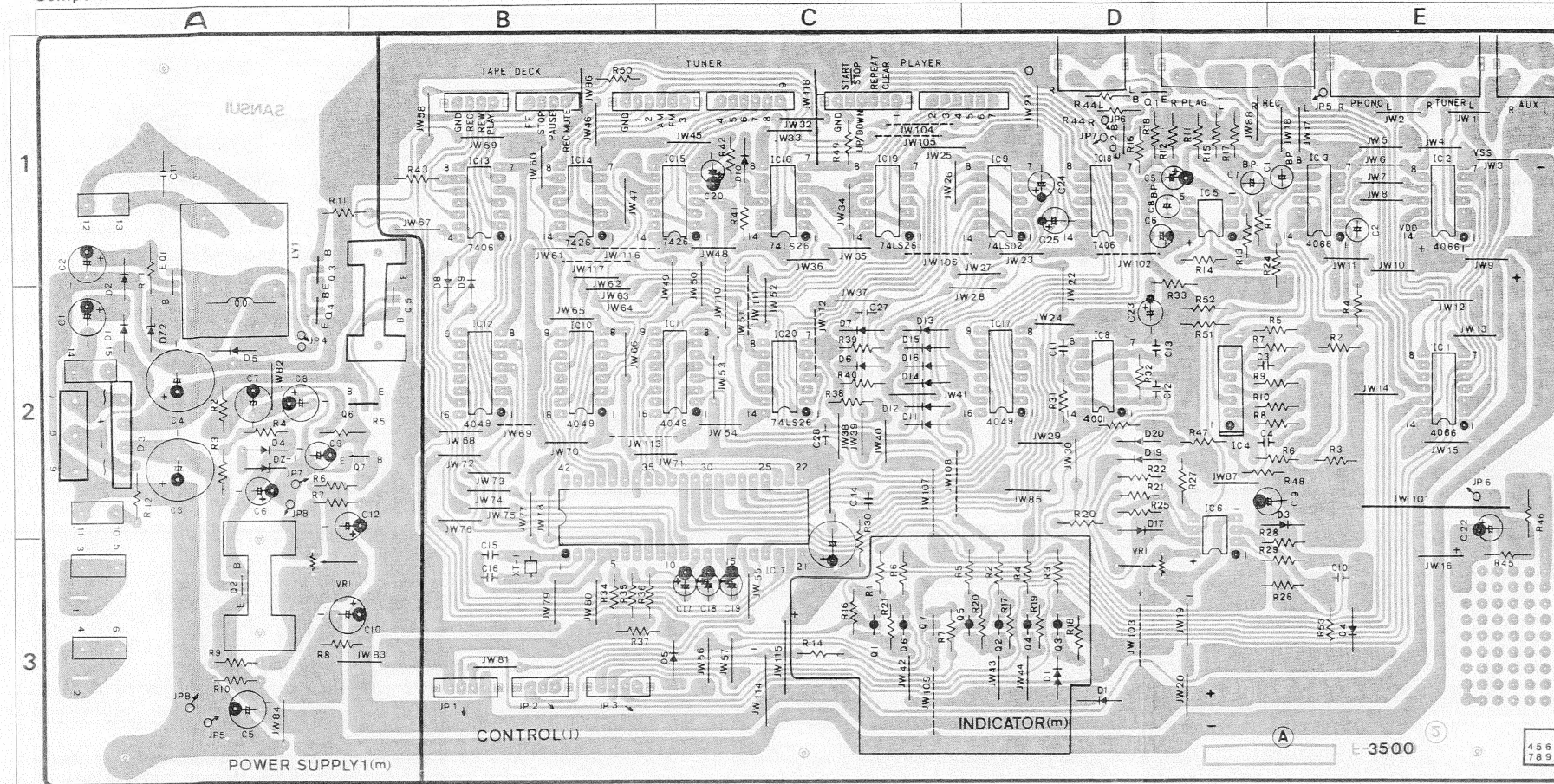
● Explanation of functions of each terminal <TC9134P>

Pin No.	Symbol	Functions
1, 2	X _T , X _T -	Oscillator terminal for timing. Used for connection of a ceramic oscillator of 455 kHz or an L.C.
3~5	C ₁ , C ₂ , C ₃	Code specifying input terminal. The code of the transmitter is compared with the code which is set with this terminal, and the input is accepted only when the codes are matched.
6~11	HP ₆ ~ HP ₁	Continuous signal output terminal. The output from this terminal is kept at "L" level while a receiving signal is input. 
12	PW on/off	External control input terminal of cyclic output CP ₁ . It is possible to control CP ₁ from the receiver, not only from the transmitter. CP ₁ reverses at "L" level.
13~15	EX ₁ , EX ₂ , D/A out	External control input terminal for a D/A converter. EX ₁ is for up and EX ₂ is for down. Operation commences at "L" level. D/A converter output terminal. Outputs V _{DD} as divided into 32 segments. 
16	RX IN	Receiving signal input terminal. Instruction signals less carrier signals are input.
17, 18	CP ₂ , CP ₁	Cyclic signal input terminal. The output reverses when a signal is received. CP ₁ can also be controlled from the IC for receiving.
19, 20, 23~41	SP ₂₂ ~ SP ₁	Single pulse output terminal. When an instruction signal is input, a pulse of "L" level is produced only for the specified output. 
21, 22	V _{DD} , GND	Power supply voltage impressing terminal.

4. PARTS LOCATION & PARTS LIST

4-1. F-3500 Remote Control Circuit Board (Stock No. 00634001)

Component Side



Parts List

Parts No.	Stock No.	Description
●Transistor		
qQ1	07197000, 1	2SA733A R, Q
	07194700, 1	2SA1015 Y, GR
qQ2	07197000, 1	2SA733A R, Q
	07194700, 1	2SA1015 Y, GR
●IC		
qIC1	07264600	MSM4066RS
qIC2	07264600	MSM4066RS
qIC3	07264600	MSM4066RS
qIC4	03703605	μPA68H
qIC5	03607700	NJM4558D
qIC6	03607700	NJM4558D
qIC7	07263800	TC-9134P
qIC8	03609500	MSM4001RS
qIC9	07265400	MB-74LS02
qIC10	03611800	MSM4049RS
qIC11	03611800	MSM4049RS
qIC12	03611800	MSM4049RS
qIC13	07265700	HD-7406
qIC14	07265500	HD-7426
qIC15	07265500	HD-7426
qIC16	07265600	MB-74LS26
qIC17	03611800	MSM4049RS
qIC18	07265700	HD-7406
qIC19	07265600	MB-74LS26
qIC20	07265600	MB-74LS26
●Diode		
qD1	03111600	1S2473D
qD2	03111600	1S2473D
qD3	03111600	1S2473D

●Since some of capacitors and resistors are omitted from parts lists in this Service Manual, refer to the Common Parts List for capacitors & resistors, which was appended previously to Sansui Manual.

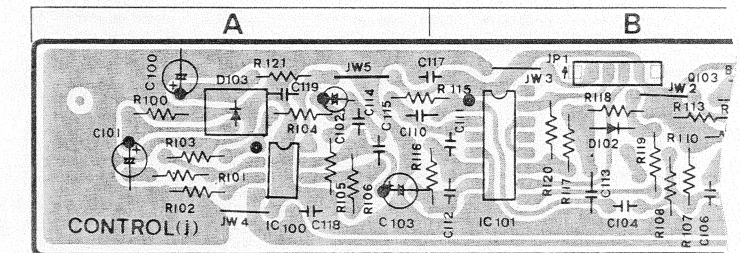
Parts No.	Stock No.	Description
qD4	03109700	1N60-P
qD5	03109700	1N60-P
qD6	03109700	1N60-P
qD7	03109700	1N60-P
qD8	03109700	1N60-P
qD9	03109700	1N60-P
qD10	03109700	1N60-P
qD11	03109700	1N60-P
qD12	03109700	1N60-P
qD13	03109700	1N60-P
qD14	03109700	1N60-P
qD15	03109700	1N60-P
qD16	03109700	1N60-P
qD17	03111600	1S2473D
qD19	03111600	1S2473D
qD20	03109700	1N60
qC1	00306800	1μF 50 V E.B.
qC2	00306800	1μF 50 V E.B.
qC7	00306800	1μF 50 V E.B.
qC8	00306800	1μF 50 V E.B.
qC9	00306800	1μF 50 V E.B.
qVR1	07238900	50kΩ (B) Volume, preset level adj.
qXO1	07274000	Ceramic Filter CSB 550A
qL1	49000800	Inductor
●Transistor		
mQ1	03085201, 2	2SD438 E, F
mQ2	03032302, 3	2SB507 E

Parts No.	Stock No.	Description
mQ3	03059501, 2	2SC945 Q, P
mQ4	03085201, 2	2SD438 E, F
mQ5	03083902, 3	2SD313 E, F
mQ6	03059501, 2	2SC945 Q, P
mQ7	03059501, 2	2SC945 Q, P
●Diode		
mD1	03117700	10E-2
mD2	03117700	10E-2
mD3	03117000	RB-152
mD4	03111600	1S2473D
●Zener Diode		
mDZ1	03185800	RD5.1E-B
mDZ2	03160600	EQA01-22R
mR12	00179100	100Ω 1W N.I.R.
mC11	00386000	0.01μF 150 V C.C.
mVR1	07241200	5 kΩ (B) Volume, a.v.r.
mLY1	07299500	Relay
●Transistor		
nQ1	07197000, 1	2SA733A R, Q
nQ2	07197000, 1	2SA733A R, Q
nQ3	07197000, 1	2SA733A R, Q
nQ4	07197000, 1	2SA733A R, Q
nQ5	07197000, 1	2SA733A R, Q
nQ6	07197000, 1	2SA733A R, Q
nQ7	03059501, 2	2SC945 Q, P

4-2. F-3501 Receiver & Indicator Circuit Board

Component Side

(Stock No. 00634101)

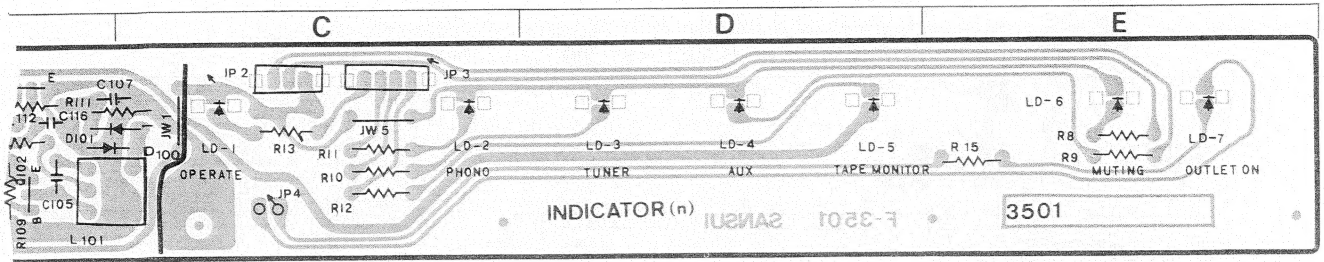


Parts List

Parts No.	Stock No.	Description
	07581900	LED Holder 1P
●Transistor		
qQ102	03059501, 2	2SC945 Q, P
qQ103	03059501, 2	2SC945 Q, P
●IC		
qIC100	03607700	NJM4558D
qIC101	03611800	MSM4049RS
●Diode		
qD100	03109700	1N60-P
qD102	03111600	1S2473D
qD103	07265900	Photo Diode NJL6143A
qL101	07264100	Filter Coil 38 kHz
nLD1	07246200	Light Emitting Diode SEL1710K
nLD2	07246200	Light Emitting Diode SEL1710K
nLD3	07246200	Light Emitting Diode SEL1710K
nLD4	07246200	Light Emitting Diode SEL1710K
nLD5	07243200	Light Emitting Diode GL-5HD5
nLD6	07246200	Light Emitting Diode SEL1710K
nLD7	07243200	Light Emitting Diode GL-5HD5

●Abbreviations

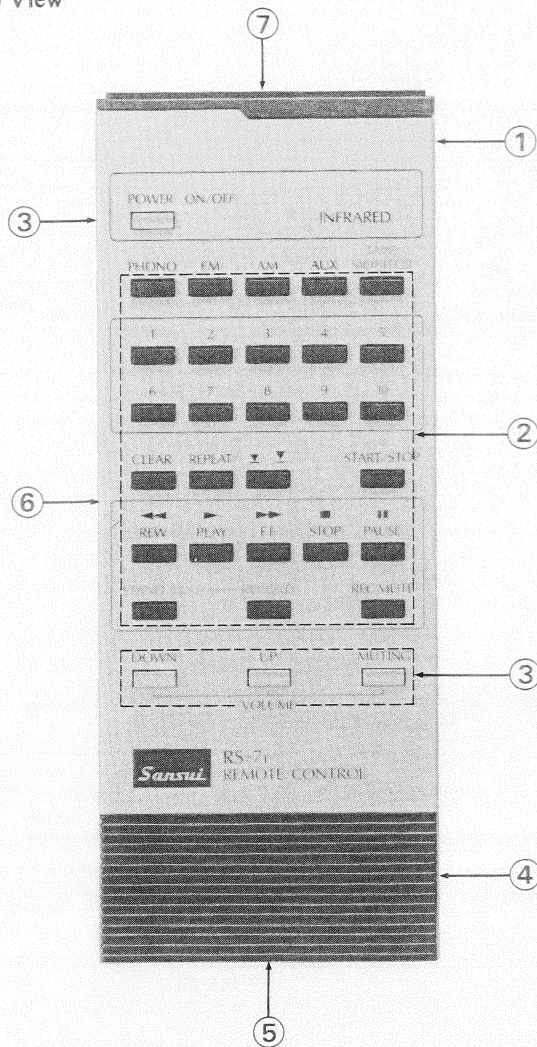
C.R. Carbon Resistor	E.L. Low Leak Electrolytic Capacitor
S.R. Solid Resistor	E.B. Bi-Polar Electrolytic Capacitor
Ce.R. Cement Resistor	E.B.L. Low Leak Bi-Polar Electrolytic Capacitor
M.R. Metal Film Resistor	Ta.C. Tantalum Capacitor
F.R. Fusing Resistor	F.C. Film Capacitor
N.I.R. Non-Inflammable Resistor	M.P. Metallized Paper Capacitor
C.C. Ceramic Capacitor	P.C. Polystyrene Capacitor
C.T. Ceramic Capacitor, Temperature Compensation	G.C. Gimmic Capacitor
E.C. Electrolytic Capacitor	



5. SCHEMATIC DIAGRAM & PARTS LIST OF TRANSMITTER

5-1. Parts List of Transmitter

A) Top View



Parts List <Top View>

Parts No.	Stock No.	Description
1	07756800	Panel Plate
2	07725200	Knob (brack)
3	07725100	Knob (white)
4	07725400	Transmitter Case (top)
5	07725000	Lid of Battery Case
6	07725500	Transmitter Case (bottom)
7	07725300	Filter
	07274700	Spacer
	07274800	φ2 x 6 Tapping Screw

B) 12KH015A Transmitter Circuit Board

Parts List

Parts No.	Stock No.	Description
•Transistor		
TR1,2	07197001,2	2SA733 Q, P
TR3	07206900,1	2SC2001 M, L
TR4	07197001,2	2SA733 Q, P
TR5	03059501,2	2SC945 Q, P
TR6	07197001,2	2SA733 Q, P
•IC		
	07263900	TC9132P
•Diode		
	07274300	1K60
•LED		
	07274100	EL-1L2
	07274000	Ceramic Filter (CSB550)
	07273800	Key Switch

•Note: The circuit board, 12KH015A is not supplied as the assembled. However, the individual parts on the circuit board are provided by orders.

5-2. Schematic Diagram <Transmitter>

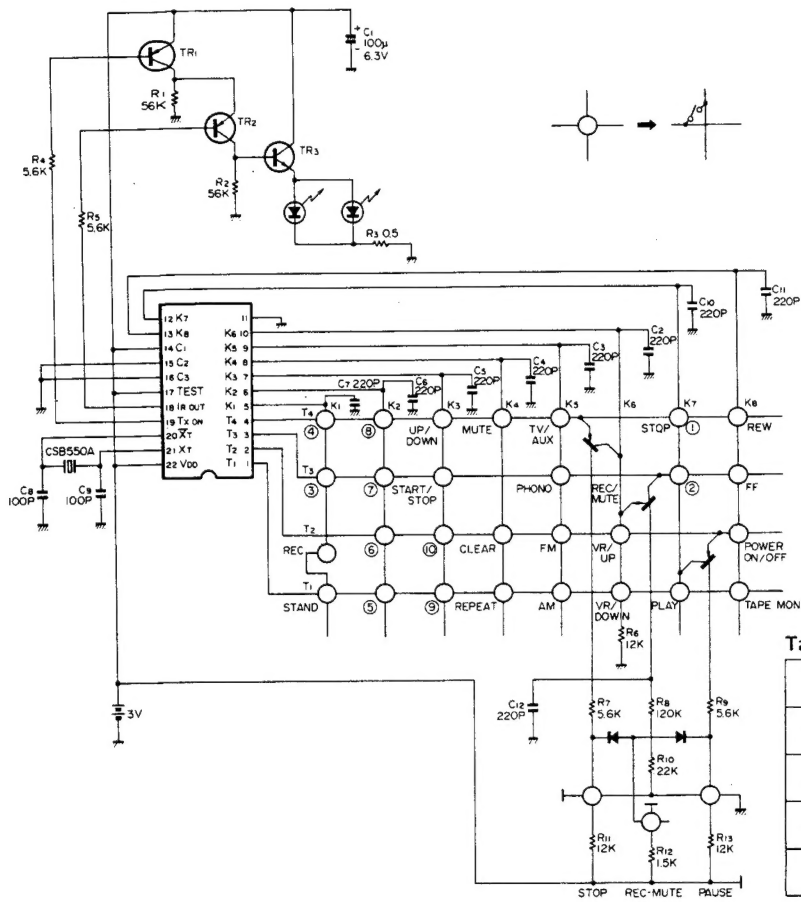


Table 5-1.

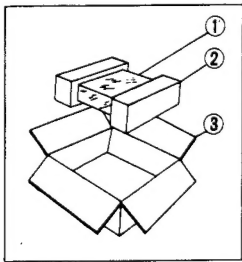
	K1	K2	K3	K4	K5	K6	K7	K8
T4	④	⑧	UP/ DOWN	MUTE	TV/ AUX	STOP	①	REW
T3	③	⑦	START /STOP		PHONO	REC MUTE	②	FF
T2		⑥	⑩	CLEAR	FM	VR UP	PAUSE	POWER ON/OFF
T1	REC	⑤	⑨	REPEAT	AM	VR DOWN	PLAY	TAPE MON

6. PACKING LIST

Parts No.	Stock No.	Description
1	07599500	Vinyl Cover
2	07661900	Styrofoam Packing
3	07732000	Carton Case (Silver Model)
	07731900	Carton Case (Black Model)

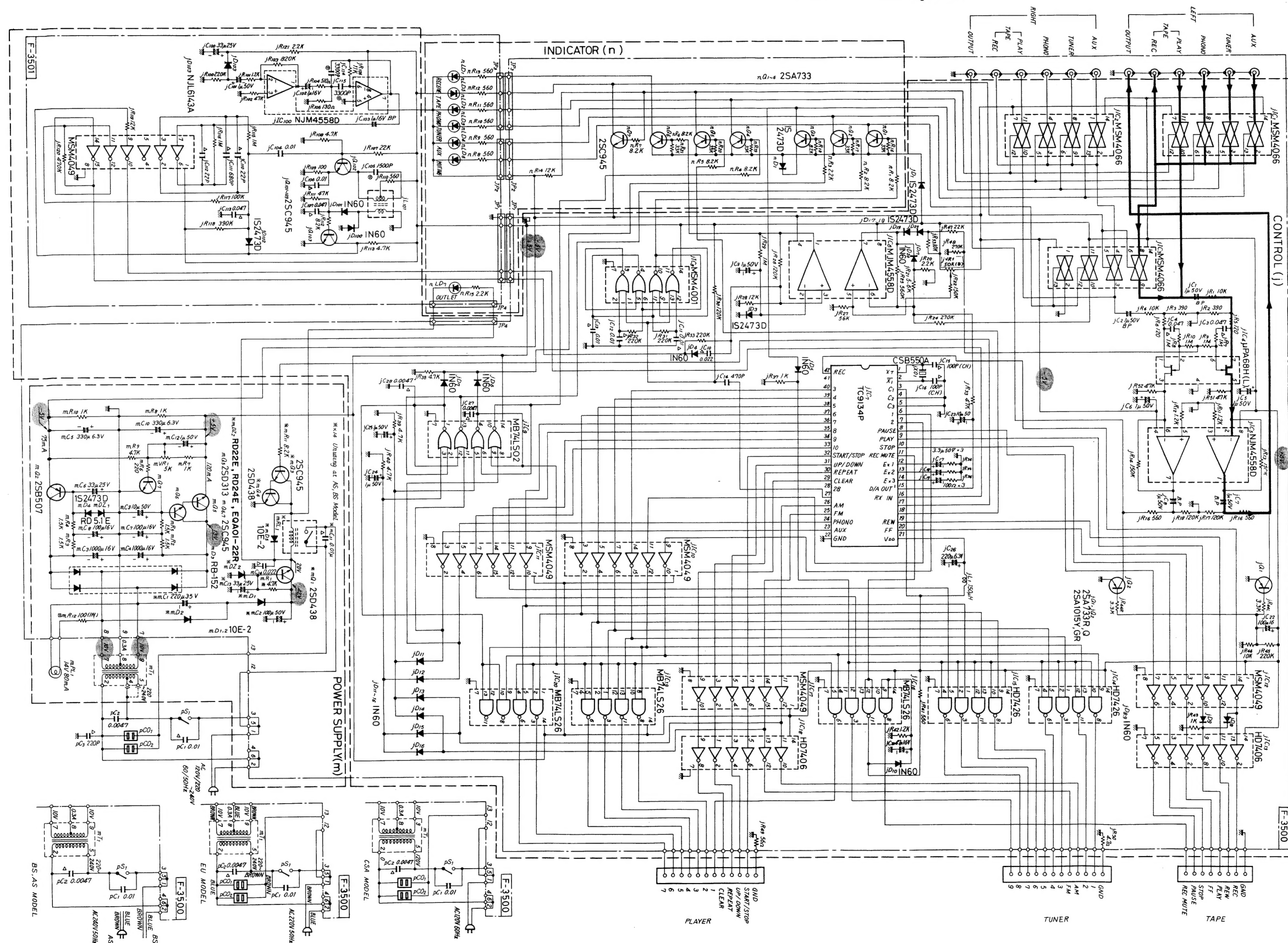
7. ACCESSORY LIST

Stock No.	Description
07670200	Operating Instruction
38103200	PJP Cord
07299200	Connection Cable Set
	Dry Battery x 2



8. SCHEMATIC DIAGRAM <Remote Control Receiver>

La présentation et les spécifications sont susceptibles d'être modifiées sans préavis par suites d'améliorations éventuelles.
Änderungen, die dem technischen Fortschritt dienen, bleiben vorbehalten.
Design and specifications subject to change without notice for improvement.



2SA733A
2SA1015
2SC945
2SD438

2SB507
2SD313

NJM4558D

MSM4066RS
MSM4001RS
MB74LS02
HD7406
HD7426
SN74LS26

MSM4049RS

TC9134P

μPA68H

RB-152

IS2473D
1N60P
10E-2

RD5.1E
RD22E

NJL6143A

1

2

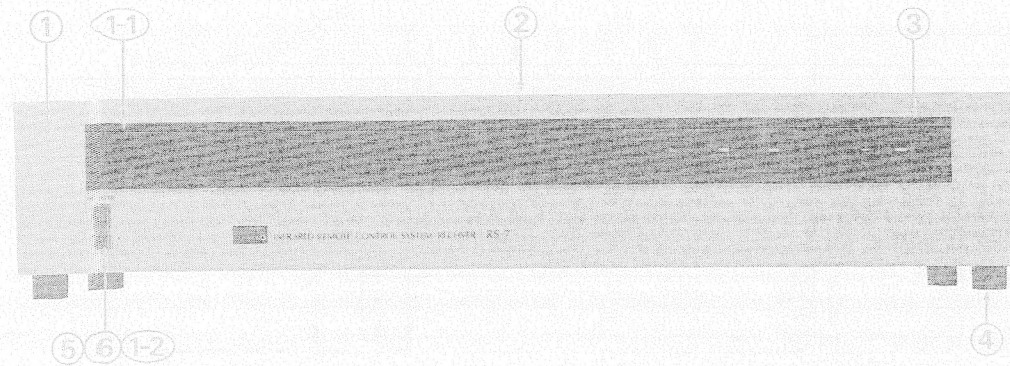
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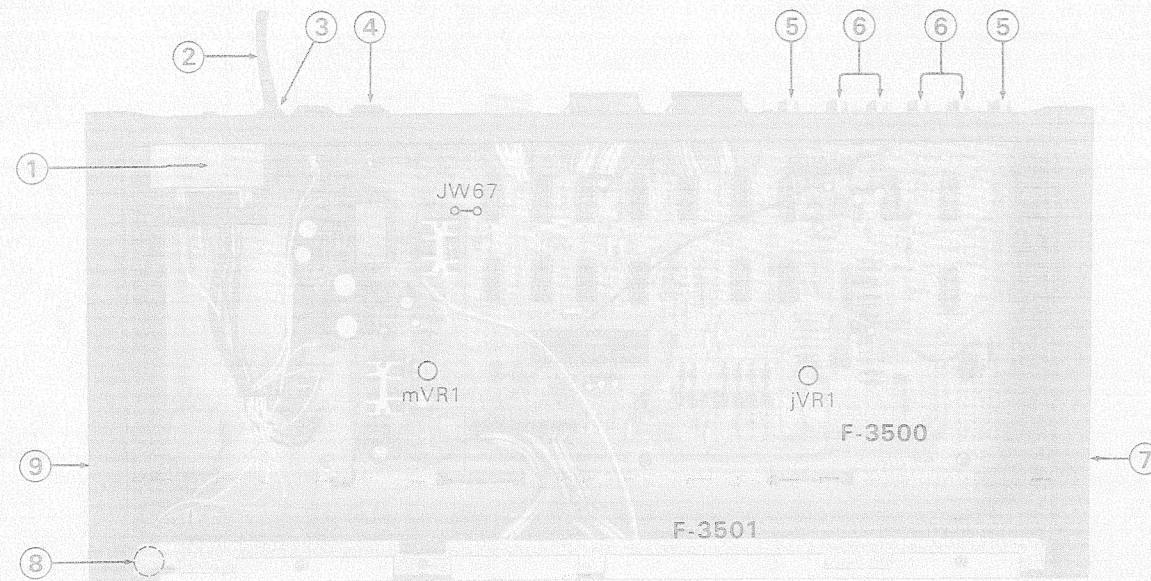
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9. OTHER PARTS

9-1. Front View



9-2. Top View



Parts List <Front View>

Parts No.	Stock No.	Description
1	07721500	Front Panel Ass'y (Silver Model)
	07721400	Front Panel Ass'y (Black Model)
1-1	07738710	Smoked Plate (Silver Model)
	07700610	Smoked Plate (Black Model)
1-2	07628100	Push Knob Guide (Silver Model)
	07595600	Push Knob Guide (Black Model)
2	07601400	Bonnet
3	07721200	Dial Scale
4	07601200	Leg
5	07194500	Push Switch, power
6	07579800	Push Knob, power (Silver Model)
	07580000	Push Knob, power (Black Model)

Parts List <Top View>

Parts No.	Stock No.	Description
1	46026901	Power Transformer
2	38004700	Power Supply Cord
3	39106000	Strain Relief
4	07189600	AC Outlet
5	07249000	Input Terminal Board 2P
6	07249100	Input Terminal Board 4P
7	07601810	Side Panel (R)
8	07267600	Pilot Lamp 14V 80mA
9	07601710	Side Panel (L)

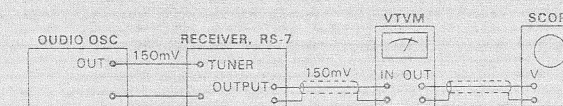
10. ADJUSTMENT <See Top View>

10-1. VDD Voltage Adjustment

- Check that the DC Voltage between the jumper wire, JW67 (+) on the substrate F-3500 and the ground is within $5V \pm 0.2V$. If out of this allowable range, regulate the voltage by adjusting the mVR1 on the substrate F-3500.

10-2. Pre-set Level Adjustment

- Do not depress Volume Control Buttons of Transmitter, RS-7.
- Feed 1 kHz sine-wave signal from audio oscillator to input terminals (tuner), L and R of Receiver, RS-7.
- Set output level of audio oscillator to 150 mV.
- Connect VTVM to the output terminal of Receiver, RS-7 and adjust for 150 mV by jVR1 on the substrate F-3500.

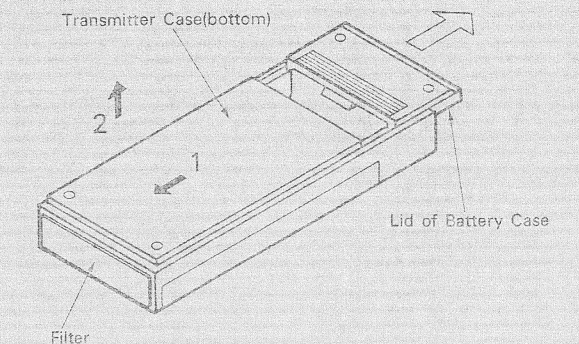


11. REPLACEMENT

11-1. Replacement of 12KH015A Transmitter Circuit Board

- Remove the lid of Battery Case.
- Remove a screw on the Battery Case.
- Take out the Transmitter Case (bottom), after moves this case (bottom) in the arrow direction.

<Bottom View>



SANSUI ELECTRIC COMPANY LTD.:
SANSUI ELECTRONICS CORPORATION:
SANSUI ELECTRONICS (U.K.) LTD.:
SANSUI ELECTRONICS G.M.B.H.:

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